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Mesquite Control on Southwestern Rangeland

Leaflet No. 421

U. S. DEPARTMENT OF AGRICULTURE

MESQUITE CONTROL on Southwestern Rangeland

by

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Many ranchers can benefit by controlling mesquite on their rangeland. Nearly 70 million acres in Texas, southern New Mexico, Arizona, and southwestern California are now occupied by mesquite. This is almost twice the area occupied 50 years ago.

When mesquite takes over, forage production goes down (fig. 1). Although mesquite leaves and beans replace some of the forage formerly furnished by perennial grass, mesquite forage does not compensate for the grass it crowds out. For example, when mesquite completely

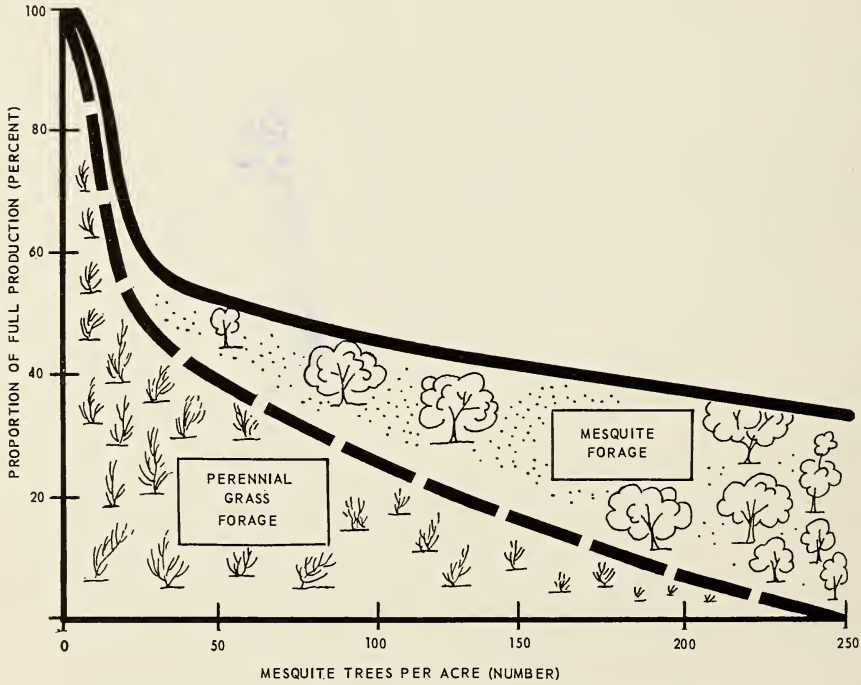

FIGURE 1.—Relation of mesquite abundance to forage production.

suppresses perennial grass, forage production is reduced to one-third of full capacity.

Proper grazing practices alone will not hold mesquite in check, because grazing animals are partly responsible for the increase. Livestock eagerly eat mesquite beans, even when perennial grass is available. Eighty to ninety percent of the mesquite seeds can germinate after passing through the animals. Thus, wandering livestock spread seeds over wide areas. In the absence of a dense perennial grass cover to retard the establishment of mesquite seedlings or adequate control measures to kill those that do become established, mesquites can survive and gradually take over grasslands.

In dense stands of mesquite, the capacity of the soil to absorb rainfall is lower than under grass cover. Thus, mesquite invasion is accompanied by increased surface runoff and higher rates of erosion. Dense stands of mesquite also make handling livestock more difficult and increase screwworm infection.

Mesquite control can be a sound investment in rangeland improvement. Control in the early stages of invasion is cheapest. Greatest opportunities for restoring grass are in formerly highly productive grassland areas. Where rainfall is low, mesquite control may not be advisable, since here only sparse stands of grass can be produced. Areas selected for mesquite control should have good soil and a relatively high rainfall. A remnant stand of perennial grass is also desirable, otherwise reseeding will be necessary.

REMOVAL BY GRUBBING

If the soil is free from large rocks, mesquites smaller than 1 inch in diameter at the ground level can be grubbed with a mattock or hoe. Root crowns, which usually lie 5 to 6 inches below the soil surface, must be removed to kill the plants. Grubbing is especially useful in the early stages of mesquite invasion and for obtaining more complete control in combination with spraying or cabling. Grubbing is effective during any season of the year.

APPLYING OIL TO STEM BASES

Low-grade diesel oil, when applied to the base of individual trees, chemically girdles the stem and kills dormant buds at the root-stem transition zone (fig. 2, *A*). Oil must be applied completely around the lower 6 to 8 inches of stem, since dormant buds are killed only by direct contact with the fluid. The amount of diesel oil necessary to kill all dormant buds depends upon the extent of the bud zone, the size and complexity of the tree, and the type of soil. On the average, 1 gallon of oil for 5 to 7 trees is sufficient. An orchard spray can operating under 10 to 20 pounds pressure is best for this job (fig. 2, *B*). Trees should be examined occasionally to see that all buds at and below the soil line are being reached by oil.

Many light petroleum oils are toxic enough to kill mesquite, but diesel oil is less expensive than kerosene or fortified oils. One-half pint of diesel oil fortified with a 1 percent solution of ethylenedibromide or a mixture of 1 percent 2,4,5-T and 2,4-D to each tree gives satis-

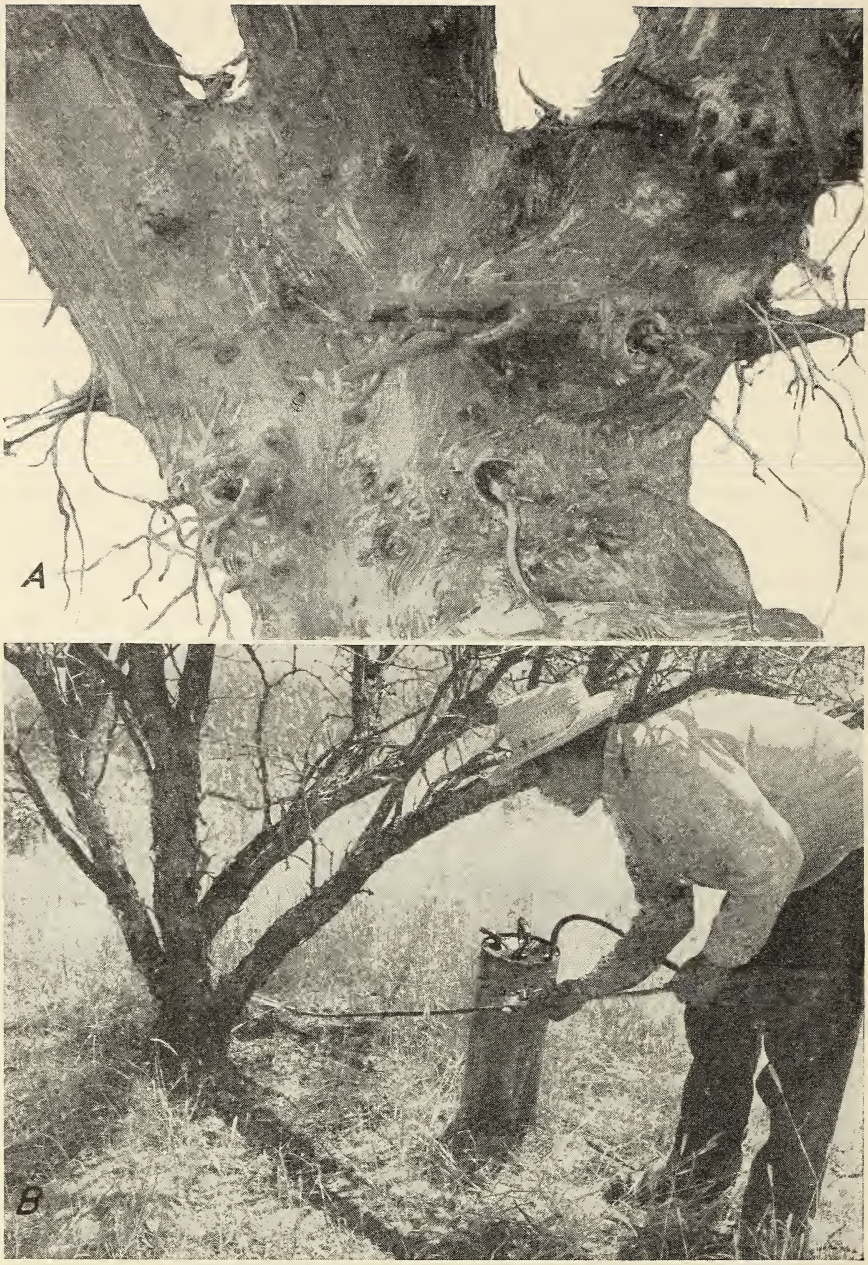

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FIGURE 2.—Single stem treatment. *A*, Dormant buds are numerous in the root-stem transition zone of mesquite trees. Oil is applied to kill these buds and to chemically girdle the tree. *B*, A pressure, orchard spray can equipped with a 3-foot piece of ¼-inch copper tubing is a good device for applying the oil.

factory kills, but costs equal or exceed those of treatment with diesel oil alone. Single stem treatment with oils should replace grubbing when mesquites are larger than 1 inch in diameter. Oiling becomes too costly, however, beyond about 100 mesquites an acre. Oil can be applied anytime during the year.

Mesquites can also be killed with sodium arsenite, but since this chemical is extremely poisonous to livestock and humans its use is no longer recommended.

CLEARING WITH MECHANICAL EQUIPMENT

For best results with chaining or cabling, trees should be larger than 2 inches in stem diameter: stands should be fairly even aged and dense (more than 100 trees per acre): soil should be moist; and topography should be relatively level. A chain or cable 300 to 500 feet long is dragged between two heavy crawler type tractors (each with 155 hp. drawbar pull or the equivalent) twice over the area in opposite directions. The tractors are driven parallel to each other as fast as possible (fig. 3, *A*). Tractors should be handled carefully to reduce disturbance of soil and grass. For cabling, use a woven, multistrand, steel wire cable about $1\frac{3}{4}$ inches in diameter. An anchor chain weighing 30 pounds a link is equally effective (fig. 3, *B*). Cabling or chaining gives best results during May through August.

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FIGURE 3.—Mass treatment of heavy stands. *A*, Cabling or chaining works well where trees are larger than 2 inches and large crawler tractors can travel easily. *B*, Dragging a heavy anchor chain (30 pounds per link) effectively uproots mesquite.

SPRAYING FOLIAGE BY AIRPLANE

In dense stands of mesquite (those exceeding 225 trees per acre), especially where the topography is rough, aerial spraying is feasible in spite of the high cost of chemicals. Under ideal conditions, spraying kills up to 50 percent of the mesquite.

Foliage sprays are handled best by a commercial airplane (fig. 4, *A*). The most effective formulation for mesquite in southern Arizona is ¾ pound per acre of 2,4,5-T low volatile ester in a mixture of 2 gallons of diesel oil and 8 gallons of water.

Proper time for spraying will vary from April 15 to July 15, depending upon the particular year. Within these months, there is a 10- to 25-day period when mesquite is most susceptible to foliage sprays. Spraying is most effective when leaves and blossoms are in full growth and developing pods are about ½ inch long (fig. 4, *B*).

When spraying mesquite by airplane, the pilot should observe commonsense safety rules on weather, terrain, and equipment. Also, he must make sure that the spray cannot drift to cotton fields, garden plants, or other highly susceptible crops.

PLANNING FOR CONTROL

In selecting the proper control method for mesquite, several factors must be considered: (1) The degree and location of the invasion, (2) age classes of trees in the stand, (3) proper season for treatment, (4)

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FIGURE 4.—*A*, Foliage sprays are most conveniently and economically applied by an airplane. *B*, At the time of spraying, mesquite trees should be in full leaf, and blossoms should have developed pods ½ to 1 inch long.

availability of labor and equipment, (5) availability of funds, and (6) desirability of investment. Figure 5 can be used as a guide in selecting the method most appropriate for the particular stand of mesquite.

Approximate costs for mesquite control can be estimated from the following figures:

Treatment:	Costs per tree: Equipment and labor	Chemical and materials	Total
Grubbing	$0.03		$0.03
Diesel oil	.035	$0.015	.05
	Costs per acre		
Cabling and chaining	2.00		2.00
Foliage spraying	1.25	2.75	4.00

Under normal conditions, a threefold increase in grazing capacity can be expected. The individual rancher must estimate this worth based upon his own operation. On the Santa Rita Experimental Range, for example, the original control cost was paid off in 10 years. On a longtime basis, killing mesquite when it first comes in is the best investment. As mesquite is permitted to become more dense, forage production drops off and eradication becomes more costly. Failure to act promptly means a greater control cost later.

BENEFITS OF CONTROL

Increase in forage is the greatest benefit from mesquite control. Moreover, these returns can be measured in terms of increased grazing capacity and greater sales of beef. By monetary analysis, a statement of profit or loss resulting from the control of mesquite can be computed.

Other benefits, although they may be just as real, are not so easy to put into monetary terms. Management of livestock is much easier and screwworm infection is lower on open grasslands than on brush in-

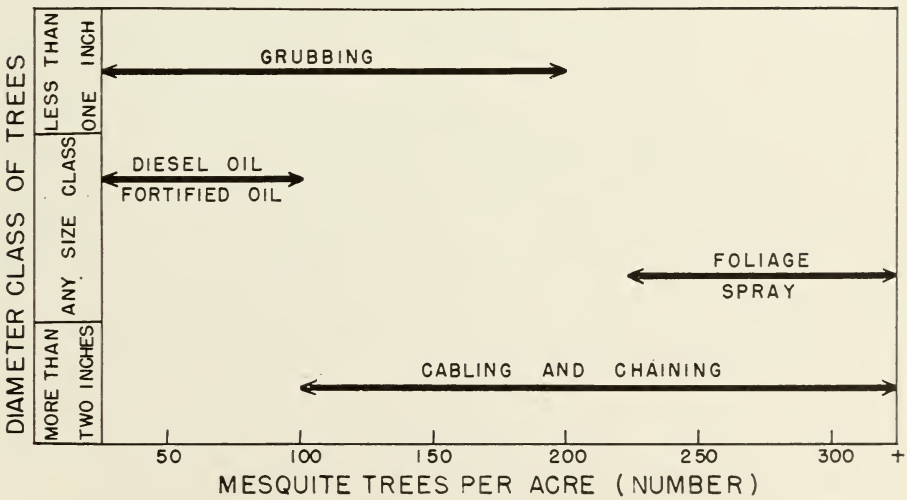

FIGURE 5.—Control methods to apply for various degrees of mesquite invasion.

fested areas. Death losses are lower; weight gains are higher; and calf crops may be better under open conditions. A good cover of grass also helps control surface runoff and erosion. Under semiarid conditions, all available rainfall should be used. This is best accomplished by a grass cover that maintains an open, porous soil. To get full benefit from mesquite control, the rancher should also apply good grazing practices and proper management. Under suitable conditions, killing mesquite is one of the best longtime investments in rangeland improvement that he can make.

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